

detection and cataloging of global explosive volcanism using the IMS infrasound network

Explosive volcanic eruptions are among the most powerful sources of infrasound observed on earth, with recordings routinely made at ranges of hundreds to thousands of kilometers. These eruptions can also inject large volumes of ash into heavily travelled aviation corridors, thus posing a significant societal and economic hazard. Detecting and counting the global occurrence of explosive volcanism helps with progress toward several goals in earth sciences and has direct applications in volcanic hazard mitigation. This project aims to build a quantitative catalog of global explosive volcanic activity using the International Monitoring System (IMS) infrasound network. We are developing methodologies to search systematically through IMS infrasound array detection bulletins to identify signals of volcanic origin. We combine infrasound signal association and source location using a brute-force, grid-search, cross-bearings approach. The algorithm corrects for a background prior rate of coherent infrasound signals in a global grid. When volcanic signals are identified, we extract metrics such as location, origin time, acoustic intensity, signal duration, and frequency content, compiling the results into a catalog. This work represents a step toward the goal of integrating IMS data products into global volcanic eruption early warning and notification systems.

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